REMARKS/ARGUMENTS

Claims 1-9 are pending herein. Claims 1-7 stand withdrawn. Claim 8 has been amended to include the subject matter of claim 10 and has been further amended as supported by page 27, lines 20-22 of the specification and Figs. 15 and 17 of the present application, for example. Claim 9 has been amended to address matters of form. Claims 10 and 11 have been cancelled without prejudice or disclaimer.

1. The objection to claims 9 and 11 is noted, but deemed moot in view of the rewritten claims submitted above.

2. The objection to claim 8 is respectfully traversed.

The Examiner is respectfully requested to note that the units "$\mu g/cm^2$" is the unit of measure that accurately defines the amount of an active element contained within the active hard brazing material per unit area of a respective bonding surface. The inventors have found that the active element, such as Ti, forms TiC, TiN or TiO_2 with the bonding surface to create an optimal surface bond. Along these lines, the inventors have determined that the amount of active element per unit area of the bonding surface is very important to the outcome of the resulting bond. Accordingly, the amount of active element is specified using the unit of "$\mu g/cm^2$" in the present invention to more accurately describe the amount of active element required to achieve the optimal surface bond. The Examiner is respectfully requested to note that since the active element quickly reacts with the bonding surface while melting the brazing material, the amount of the active element per unit area does not change before and after extrusion.

For at least the foregoing reasons, Applicants respectfully submit that the recited units "$\mu g/cm^2$" are not indefinite, but in fact accurately describe the amount of active element required to ensure the benefits of the present invention. Reconsideration and withdrawal of the present objection are respectfully requested.

3. Claims 8-11 were rejected under §103(a) over Sasaki. To the extent that the present rejection may be applied against the amended claims, it is respectfully traversed.

Claim 8 recites a heat spreader module comprising active hard brazing materials each containing an active element, between a pedestal, a heat spreader member, an insulating board, and a metal plate. The active hard brazing materials are supplied having a thickness ranging from 3 to 20 μm. Claim 8 has been amended to clarify that the active element of the active hard brazing materials is contained in an amount ranging from 426.8 to 1200 $\mu g/cm^2$, and the metal plate includes a marginal edge of alloy having a width no greater than 200 μm.

Applicants respectfully submit that the desired optimal bonding characteristics, including the formation of a marginal edge of alloy having a width no greater than 200 μm, are reliably achieved when the active element of the hard brazing materials is present in an amount ranging from 426.8 to 1200 $\mu g/cm^2$. In an effort to help clarify the criticality of the recited range, the Examiner is respectfully requested to note the attached chart, which combines the data provided in Figs. 15 and 17 of the present application. Consistently optimal surface bonds (designated as an "O" in the "BONDING" column) occur with a minimum of 426.8 $\mu g/cm^2$ of the active element. Further, the Examiner is respectfully requested to note that the upper limit for the amount of active element is 1200 $\mu g/cm^2$, because the thermal conductivity is significantly reduced when the active element is increased beyond this level (specification, page 27, lines 20-22).

The Examiner correctly asserts on page 3 of the Office Action that Sasaki does not specifically disclose the use of an active hard brazing material containing the claimed amount of an active element. While Sasaki indicates, in Table 1, that an active element can be added to the hard brazing materials, Sasaki in no way discloses or suggests that the amount of the active element can or should be adjusted on the basis of weight per unit of surface area to achieve optimal bonding. In other words, Sasaki does not recognize that the amount of the active element is a result-effective

variable, which directly affects the resulting bonding strength, and Sasaki does not recognize that the bonding quality is a function of the amount of an active element per unit of surface area in the active hard brazing materials. Therefore, it would not have been obvious to one skilled in the art to merely adjust the amount of the active element on the basis of the surface area to be bonded to achieve the amount ranging from 426.8 to 1200 $\mu g/cm^2$, recited in claim 8.

Further, the Examiner correctly asserts, on page 3 of the Office Action, that Sasaki does not specifically disclose a metal plate including a marginal edge of alloy having a width no greater than 200 μm. The Examiner's assertions in the last paragraph on page 3 of the Office Action that it would have been obvious to have a "metal plate having width within a range of 200 μm in order to provide minimum sized and easy for pressure and melt, bond on the insulation board" appears to indicate that the Examiner is interpreting the claim language to indicate that the metal plate has a physical width within a range of 200 μm. This is incorrect. The Examiner is respectfully requested to note that claim 8 (previously claim 10) recites that the metal plate includes a marginal edge of alloy having a width no greater than 200 μm. As shown in Figs. 9a, 9b, 10a, 10b of the present application, the marginal edge of alloy is created by an amount of squeezed-out active hard brazing material 80. Sasaki does not disclose or suggest that a marginal edge of alloy can be created or that a marginal edge of alloy exists in any form. In other words, Sasaki fails to disclose or suggest any form of marginal edge of alloy that could be considered to be a result-effective variable that could be optimized by one skilled in the art. Therefore, it would not have been obvious to one skilled in the art to provide or create a metal plate including a marginal edge of alloy having a width no greater than 200 μm, as recited in claim 8.

For at least the foregoing reasons, Applicants respectfully submit that the heat spreader module recited in claim 8 would not have been obvious to one skilled in the art provided with the disclosure of Sasaki. Since claim 9 depends directly from claim 8, claim 9 is also believed to be allowable over the applied prior art. Accordingly, reconsideration and withdrawal of the present rejection are respectfully requested.

For at least the foregoing reasons, Applicants respectfully submit that all pending claims herein define patentable subject matter over the art of record. Accordingly, the Examiner is requested to issue a Notice of Allowance for this application in due course.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

June 14, 2007
Date

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SPB/TE/tlp

Attachment: Chart

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	COMPOSITION	W1(mg/cm2)	W2(μg/cm2)	W2/W1	BONDING	ALLOYING
Fig 15-1	①60Ag-24.7Cu-14In-1.3Ti	2.91	37.83	0.013	×	
Fig 15-2	①60Ag-24.7Cu-14In-1.3Ti	4.85	63.05	0.013	○	
Fig 15-6	②59.8Ag-24Cu-14In-2.2Ti	2.91	64.02	0.022	○	
Fig 15-3	①60Ag-24.7Cu-14In-1.3Ti	7.28	94.64	0.013	○	
Fig 15-7	②59.8Ag-24Cu-14In-2.2Ti	4.85	106.7	0.022	○	
Fig 17-5	②59.8Ag-24Cu-14In-2.2Ti	4.85	106.7	0.022	×	◎
Fig 15-4	①60Ag-24.7Cu-14In-1.3Ti	9.7	126.1	0.013	○	
Fig 17-1	①60Ag-24.7Cu-14In-1.3Ti	9.7	126.1	0.013	×	○
Fig 15-8	②59.8Ag-24Cu-14In-2.2Ti	7.28	160.16	0.022	○	
Fig 17-6	②59.8Ag-24Cu-14In-2.2Ti	7.28	160.16	0.022	×	◎
Fig 15-9	②59.8Ag-24Cu-14In-2.2Ti	9.7	213.4	0.022	○	
Fig 17-7	②59.8Ag-24Cu-14In-2.2Ti	9.7	213.4	0.022	×	○
Fig 17-12	③58.4Ag-23.5Cu-13.5In-4.5Ti	4.85	218.25	0.045	×	◎
Fig 15-5	①60Ag-24.7Cu-14In-1.3Ti	19.4	252.2	0.013	○	
Fig 17-2	①60Ag-24.7Cu-14In-1.3Ti	19.4	252.2	0.013	×	○
Fig 17-8	②59.8Ag-24Cu-14In-2.2Ti	14.55	320.1	0.022	○	○
Fig 17-13	③58.4Ag-23.5Cu-13.5In-4.5Ti	7.28	327.6	0.045	○	◎
Fig 17-18	④58Ag-22Cu-13In-7Ti	4.85	339.5	0.07	○	◎
Fig 17-3	①60Ag-24.7Cu-14In-1.3Ti	29.1	378.3	0.013	×	×
Fig 15-10	②59.8Ag-24Cu-14In-2.2Ti	19.4	426.8	0.022	○	
Fig 17-9	②59.8Ag-24Cu-14In-2.2Ti	19.4	426.8	0.022	○	○
Fig 17-14	③58.4Ag-23.5Cu-13.5In-4.5Ti	9.7	436.5	0.045	○	○
Fig 17-19	④58Ag-22Cu-13In-7Ti	7.28	509.6	0.07	○	◎
Fig 17-4	①60Ag-24.7Cu-14In-1.3Ti	48.5	630.5	0.013	○	×
Fig 17-10	②59.8Ag-24Cu-14In-2.2Ti	29.1	640.2	0.022	○	×
Fig 17-15	③58.4Ag-23.5Cu-13.5In-4.5Ti	14.55	654.75	0.045	○	○
Fig 17-20	④58Ag-22Cu-13In-7Ti	9.7	679	0.07	○	○
Fig 17-16	③58.4Ag-23.5Cu-13.5In-4.5Ti	19.4	873	0.045	○	○
Fig 17-21	④58Ag-22Cu-13In-7Ti	14.55	1018.5	0.07	○	○
Fig 17-11	②59.8Ag-24Cu-14In-2.2Ti	48.5	1067	0.022	○	×
Fig 17-17	③58.4Ag-23.5Cu-13.5In-4.5Ti	29.1	1309.5	0.045	○	×
Fig 17-22	④58Ag-22Cu-13In-7Ti	19.4	1358	0.07	○	○
Fig 17-23	②58Ag-22Cu-13In-7Ti	29.1	2037	0.07	○	×